**Course:** Math 8 **CCSS Standard Number(s):** 8.EE.1**-**Laws of Exponents **Days:** 2 - 4 (if necessary)

**Unit # and Title:** Unit One – Expressions and the Number System **Block(s)/Period(s): 1 2 3 4 5 6**

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| **Unit Essential Question(s):** | When would you use the properties of integer exponents? | | |
| **Learning Target(s)**  **“I can statements”** | I can recognize and apply the properties of integer exponents. (positive and negative)  I can generate equivalent numerical expressions using the properties of integer exponents. | | |
| **Essential Vocabulary** | laws of exponents standard form of a number square negative cube exponent integer expression | | |
| **Resources and Materials** | **Teacher** | | **Student** |
| Dinah Zike’s Foldable book  Mathscool discs/transparencies  Index cards  Computer lab Access  Handouts | | Mathscool Worksheets or Transparencies  Construction paper  Markers  Calculators |
| **8 Mathematical Practices:** | | | |
| 1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics. | | **5. Use appropriate tools strategically.**  6. Attend to precision.  **7. Look for and make use of structure.**  **8. Look for and express regularity in repeated reasoning.** | |
| **Activating Strategy**  **(Opening Activity)** | **Lesson 1)** Have student pic a different color popsicle stick or colored piece of paper and have them get into 4 groups based on the color.  **Lesson 2)** As students walk in give them each an index card with an amount of money that is written as an exponent on it (See exponential dollars template). These will be used later in the lesson after we have covered the concept.  Class opener question from Mathscool 5.6 lesson notes question #10: *Angie won a math contest. On the first day she received $4. Then, for each day after the first day, she received double the previous day’s amount. How much money did Angie receive on the fifth day?* | | |
| Cognitive Teaching Strategies  Me/We/Few/You  (TIP-Teacher input  SAP-Student actively participates  GP – Guided Practice  IP-Independent Practice) | **First Lesson**  **(Few)-** Each group will be given a set problems in expanded form that they need to solve and try to figure out the pattern used. Once they figure out the answer they need to write it in exponential form. The teacher will be coming around to each team individually to assist them in discovering their law.  **(We)-** Each group will explain their particular exponent law to the class and how they came up with it. After groups have covered their laws as a class we will watch the gaggle tube Super Bass video. Students will then work with their teams to come up with their own creative way to convey their law to the class. Each team will share.  **(SAP)-** As we are going over laws students will add each on in their graphic organizer each rule as they are explained (flow chart from GEMS…see math 8 ee.1 resources)   * Negative * Zero/Power of 1 * Power to a power * Same base multiplied * Same base divided   **(You)-** Students will complete the Common Core workbook pages 3 and 4  **Second Lesson**  **(Me)-** The teacher will choose a student to explain their answer to the class opener problem and ask them how they figured it out. Students will be allowed to explain what they did to get the answer. If no correct answer was given teacher will be sure to go over the problem. \*\*Teachers be sure to explain the laws of exponents with and **WITHOUT** the calculator.  **(We/Few)-** As a class we will go through the Mathscool section 5.6 Activity. Students will work with a partner and using Rally Coach Kagan Method <http://www.usd416.org/pages/uploaded_files/Rally_Coach.pdf> complete the lesson notes.  **Task 1(GP):** With help from the teacher, students will create a graphic organizer that will state the “Laws of exponents” in their own words. Students can choose between a 5 tab match book, a 5 tab book, concept map book, or layered look book.  **(You)-** Student practice book pages 5-6 | | |
| **Summarizing Strategy**  **(Closing Activity)** | **First Lesson:** As a class we will summarize by playing Exponent MATHO or the exponent review game. See Attached  **Second Lesson:** Students will pull out their index cards and try to figure out how much money they have after everyone has calculated they will get in ascending order by how much money they received. | | |
| **Assessment/Homework** | **Lesson 1:** Glencoe text book section 2-8 and 2-9  **Lesson 2:** Mathscool 5.6 Independent Journal Questions 1- 4 Have students copy before they leave class and bring back the next day completed.  **Journal**  **1.** Explain how to write 64 as the factor, two, raised to a power.  **2.** Express the following product using exponents. Explain your procedure. 53 × 56  **3.** Evaluate the following expression. Explain your procedure. 92 – 27  **4.** Evaluate each of the following expressions. Explain the differences between them.  42, -42, (-4)2, -(-4)2 | | |
| **Extending/Refining** | **Lesson 1:** If computer access is available take class and allow them to play The Exponent Game found in the 8th grade unit resources. <http://www.math-play.com/exponent-game.html>  **Lesson 2:** This lesson can be tied back to what the students learned about how to use standard, exponential, and expanded form. | | |